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Supplement of

Spatial variations, origins, and risk assessments of polycyclic aromatic hydrocarbons in French soils

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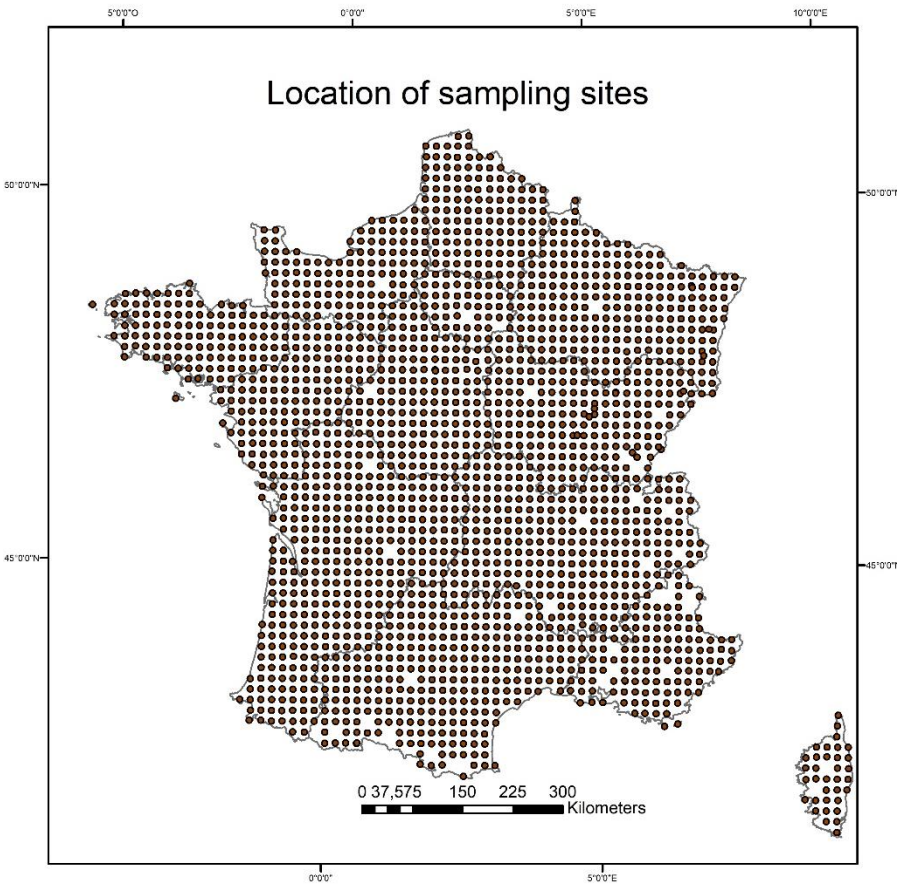

Figure S 1 Map of the sampling sites over France, based on the 16 x 16 km grid [1]

Table S 1 Values of PAHs of the reference material used by the Laboratory of Soil Analysis (LAS, Arras, France)

PAHs compound	**Unit**	**Min**	Max	**Mean reference value**
Naphthalene	mg/kg	0.297	0.707	0.502
Acenaphtene	mg/kg	0.1	0.203	0.152
Fluorene	mg/kg	0.114	0.204	0.159
Phenanthrene	mg/kg	1.172	1.651	1.412
Anthracene	mg/kg	0.285	0.349	0.317
Fluoranthene	mg/kg	1.1558	2.237	1.897
Pyrene	mg/kg	1.243	1.723	1.483
Benzo(a)anthracene	mg/kg	0.808	1.111	0.96
Chrysene	mg/kg	0.709	1.128	0.918
Benzo(b)fluoranthene	mg/kg	0.891	1.273	1.082
Benzo(k)fluoranthene	mg/kg	0.474	0.66	0.567
Benzo(a)pyrene	mg/kg	0.71	1.178	0.944
Dibenzo(a,h)anthracene	mg/kg	0.25	0.334	0.292
Benzo(ghi)perylene	mg/kg	0.701	1.069	0.885
Acenaphtylene	mg/kg	0	0	0
Indeno(123,cd)pyrene	mg/kg	0.574	0.938	0.756

Table S 2: Uncertainties values of PAH concentrations based on the integration of standard error of both repeatability and internal reproducibility. For each PAH concentration, uncertainty is calculated as : U = a[C] + b

	a	b
Acenaphtene µg/kg	0.37	2.00
Anthracene µg/kg	0.47	1.00
Benzo(a)anthracene µg/kg	0.38	2.00
Benzo(ghi)perylene µg/kg	0.16	10.00
Benzo(k)Fluoranthene µg/kg	0.20	1.00
Chrysene µg/kg	0.32	10.00
Dibenzo(a,h)anthracene µg/kg	0.18	4.00
Fluorene µg/kg	0.58	1.00
Indeno(1,2,3-cd)pyrene µg/kg	0.21	2.00
Naphthalene µg/kg	0.31	4.00
Phenanthrene µg/kg	0.31	2.00
Pyrene µg/kg	0.27	2.00
Acenaphtylene µg/kg	1.98	0.002
Benzo(a)pyrene µg/kg	0.23	9.01
Benzo(b)Fluoranthene µg/kg	0.22	9.01
Fluoranthene µg/kg	0.27	11.18

Table S 3 Toxic equivalent factor for PAH [2,3]

PAH molecule	Toxic equivalent factor
Naphthalene	0.001
Acenaphthene	0.001
Fluorene	0.001
Phenanthrene	0.001
Anthracene	0.01
Fluoranthene	0.001
Pyrene	0.001
Benzo(a)anthracene	0.1
Chrysene	0.01
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Benzo(a)pyrene	1
Dibenzo(ah)anthracene	1
Indeno(123cd)pyrene	0.1
Benzo(ghi)perylene	0.01

[1] D. Arrouays, C. Jolivet, L. Boulonne, G. Bodineau, N.P.A. Saby, E. Grolleau, A New Initiative in France: A Multi-Institutional Soil Quality Monitoring Network, Comptes Rendus l'Academie d'Agriculture Fr. 88 (2002) 93–103.

[2] I.C.T. Nisbet, P.K. LaGoy, Toxic equivalency factors (TEFs) for polycyclic aromatic hydrocarbons (PAHs), Regul. Toxicol. Pharmacol. 16 (1992) 290–300. https://doi.org/10.1016/0273-2300(92)90009-X.

[3] INERIS, Portail Substances Chimiques, (2018).

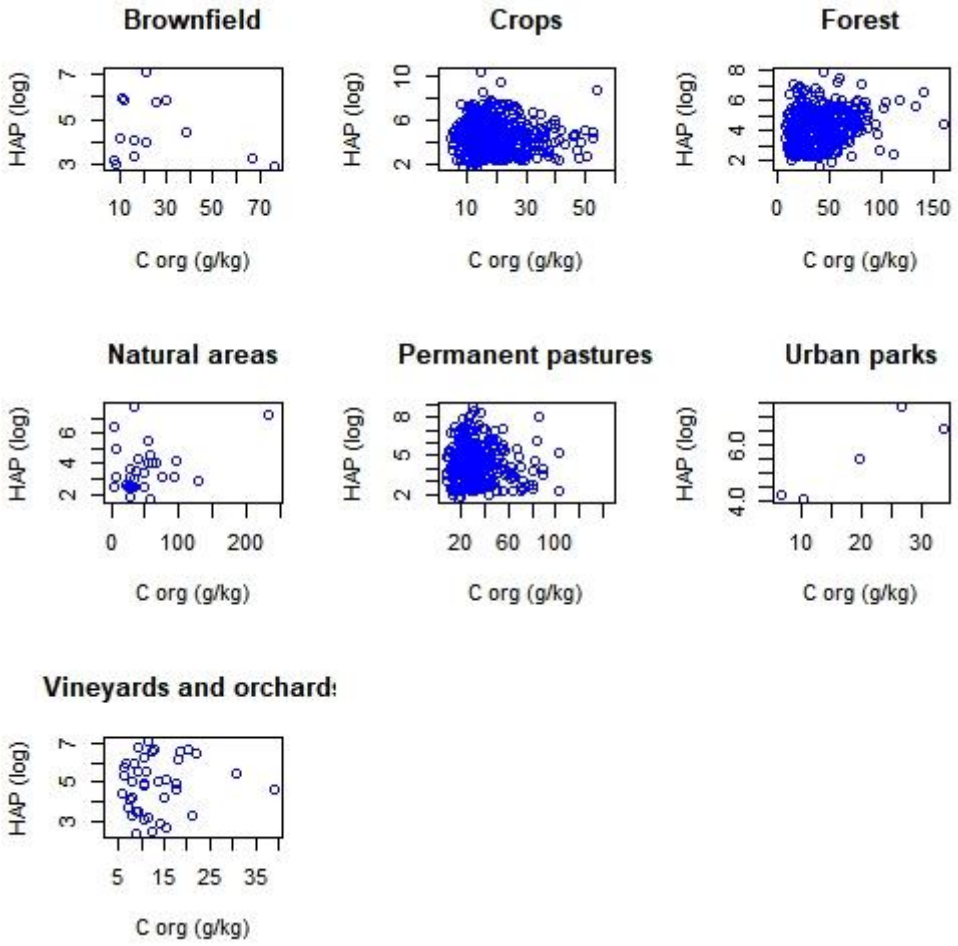

Figure S 2 Plots of total PAH content (in log) with organic carbon content in g/kg

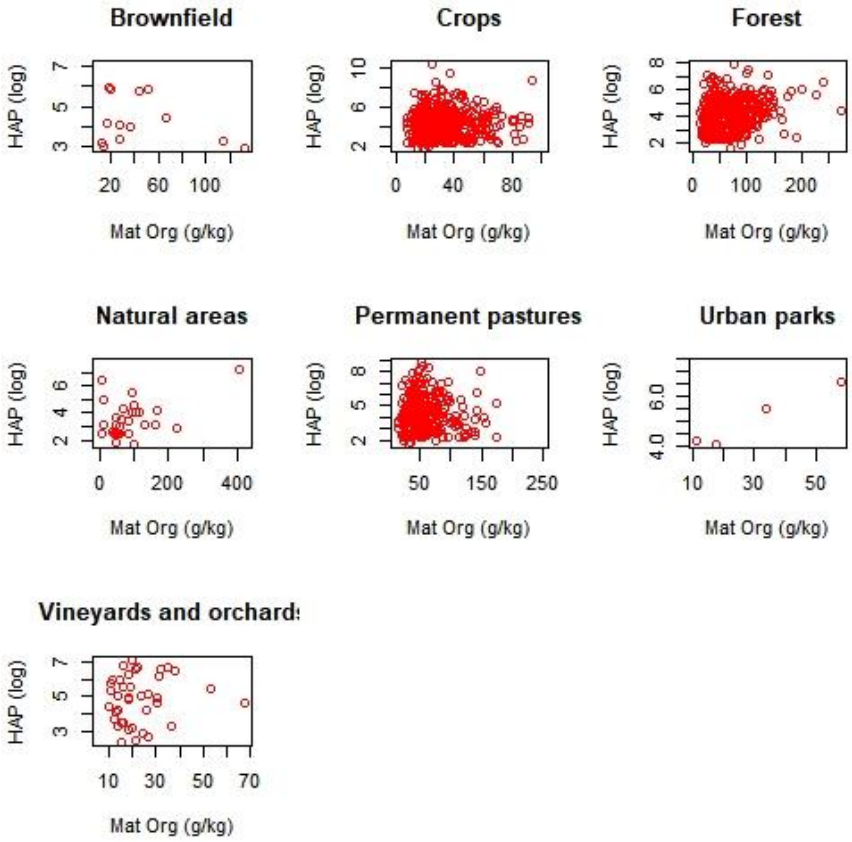

Figure S 3 Plots of PAH content (log) with organic matter (g/kg)

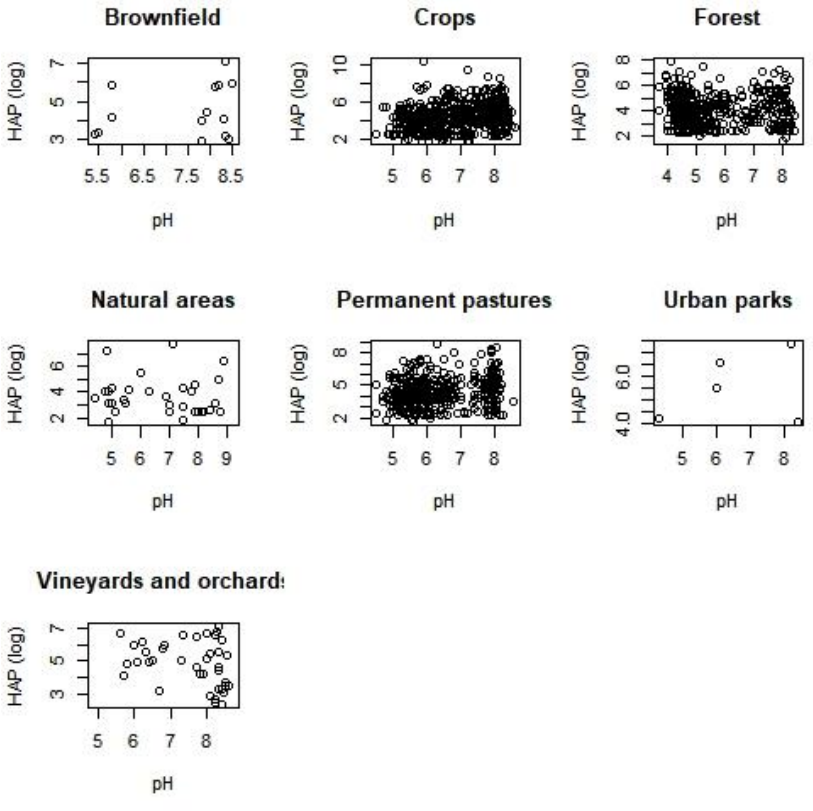

Figure S 4 Plots of PAH content (log) with pH

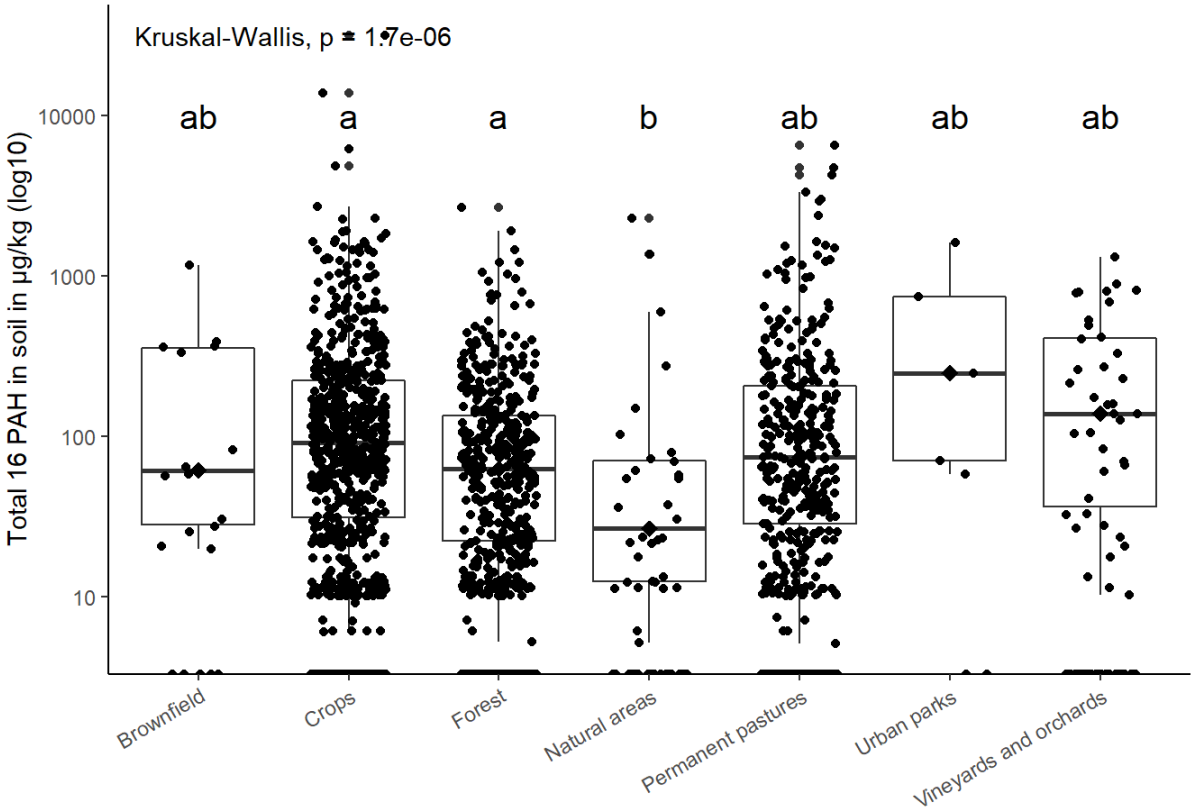

Figure S 5 Total PAH content displayed by landuse with kruskal-wallis test and attributed groups

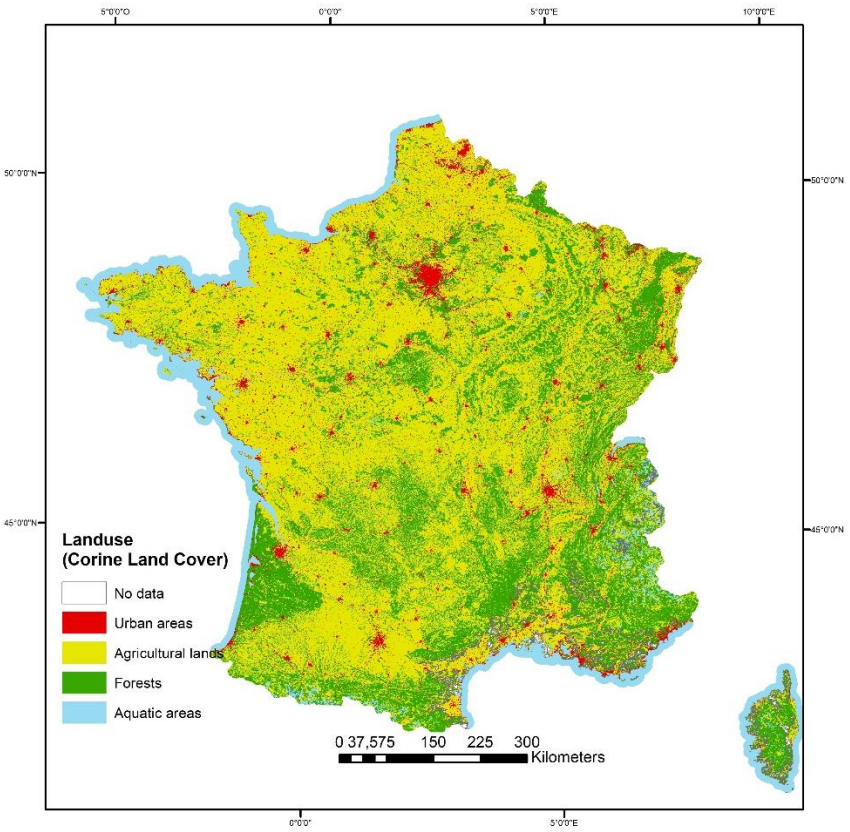

Figure S 6 Landuse of France based on Corine Land Cover (2006)